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varying from three to fourteen miles an hour; and further to ascertain how far and with what advantage steam could be applied either as a tractive or propelling power instead of horses. These experiments were published at the expense of the company; and although the objects for which they were undertaken were not fully realised, they led the author's mind to a subject of higher importance, namely, the employment of iron as a material for shipbuilding. Iron boats were indeed in use previously, but they had never been constructed on principles fitted to enable them to resist the violence of storms, and to meet all the requirements of vessels intended to navigate the open sea. Mr. Fairbairn, aware of the importance of this new field of inquiry, bestowed thereon the full energy of his powerful intellect, and was rewarded with great success. Among the earliest improvers of this branch of practical science, he embarked largely in the manufacture of them both in London and in Manchester, and has since constructed above 100 iron ships, some of them war-frigates of nearly 2,000 tons burden.

During the years 1834-1835, the use of a hot blast for melting iron ores became prevalent, and along with this important improvement a very inferior description of iron was introduced. To relieve the public mind, and determine the relative merits of the new manufacture, Mr. Fairbairn and Mr. (now Professor) Hodgkinson were requested by "The British Association for the Advancement of Science" to investigate the cause of certain supposed defects; and after a most laborious experimental research, the reports of both gentlemen were published in full in the "Transactions" of the Association.

Almost simultaneously with this investigation into the properties and comparative value of the hot and cold blast-iron, Mr. Fairbairn instituted an experimental inquiry into the relative values and properties of all the British irons. The valuable results were published in the "Memoirs of the Literary and Philosophical Society of Manchester." These papers were at intervals followed by others on scientific subjects, which were honoured with the approval of learned societies, and published in their "Transactions." Whilst these investigations were going forward for the purpose of discovery and improvement, Mr. Fairbairn was involved in the multi-form and engrossing duties of large engineering establishments, the successful conduct of which has largely increased his reputation and augmented his wealth.

The most distinguished and lasting monument which Mr. Fairbairn has hitherto erected to his fame, is his construction of the Britannia and Conway Tubular Bridges. The conception of the grand and novel design, as Mr. Fairbairn has unreservedly stated, belongs to Mr. Stephenson, who also deserves high praise for the share which he took in the labour as a colleague with the subject of this memoir. The respective shares taken in the construction by these two eminent men have unhappily been brought into dispute. While we maintain the just rights of the one, we have no wish whatever to derogate from the merit of the other; and an impartial review of the controversy authorises us to say, that without Mr. Fairbairn's practical knowledge and skill, Mr. Stephenson's idea would not have been carried into effect.

The reputation acquired by Mr. Fairbairn generally as a constructive engineer, has led to his services being put in requisition in all parts of Europe, whether for the heavier sort of mill work, iron shipbuilding, or locomotive engines; he has also successfully erected more than one hundred public bridges from forty to two hundred feet in span.

These eminent services have brought him honours from many quarters. Learned societies and crowned heads have bestowed on him tokens of their sense of his great and numerous merits.

While thus reaping the appropriate rewards of his genius, enterprise, and industry in the highest walks of life, Mr. Fairbairn, glad to help others to rise, occasionally devotes the resources of his richly-furnished mind to the instruction of the humbler classes. Two lectures are before us on "The Construction of Boilers," and on "Boiler Explosions," which

he recently delivered before the Leeds Mechanics' Institution. From this pamphlet we make a quotation:—

"The modifications of the steam-engine which have been adopted since its introduction by Watt, three-quarters of a century ago, have been very numerous and varied; and although the progression in its applications and improvements has been most rapid and wonderful, we are still undecided as to the best form of its construction. Sound principles, scientifically applied, and the gradually increasing excellence of our workshop, have enabled us to attain the great perfection which characterises the working parts of the modern steam-engine. The steam-engine itself may be regarded as a comparatively perfect machine, and I shall, therefore, confine my observations almost exclusively to that very important and necessary adjunct, *the boiler*, which is the source of all its power. With this limitation a very wide field of inquiry is opened out, and in the earliest steps of the investigation we become perplexed with the endless variety of forms and constructions which at different periods have been adopted by engineers, and which have never, unfortunately, received the same judicious attention that was paid to the steam-engine. This is an anomalous and much-to-be-regretted fact, for the boiler being the source of the motive-power, is one of the most important parts of the whole machine. Upon its proper proportions and arrangements for the generation of steam depend the economy and regularity with which the engine can be worked; and upon its strength and excellence of workmanship depends the safety of the lives and property of those who come in contact with it. Regarding the steam-engine as one of the most active agents in the extension of our prosperity, and in the civilization of the world, and seeing how it is mixed up with the daily duties and workings of society, the safety and efficiency of every part, and more especially the boiler, are subjects of national importance; and I feel gratified by being called upon to lay before you such knowledge and experience on this subject of deep interest as I myself possess."

### EARTHLY HONOURS.

(A Sonnet by Edward Bolton, published in 1610.)

"As withereth the primrose by the river,  
As fadeth summer's sun from gliding fountains,  
As vanisheth the light-blown bubble ever,  
As melteth snow upon the massy mountains;  
So melts, so vanisheth, so fades, so withers,  
The rose, the shine, the bubble, and the snow  
Of praise, pomp, glory, joy—which short life gathers.  
Fair praise, vain pomp, sweet glory, brittle joy,  
The wither'd primrose by the mourning river,  
The faded summer sun from weeping fountains,  
The light-blown bubble vanished for ever,  
The molten snow upon the naked mountains,  
Are emblems—that the treasures we up-lay  
Soon wither, vanish, fade, and melt away."

### THE CASCADE OF THE ROCK.

SOME of the most romantic and picturesque scenes in all fair France are to be found in the department of the Haute-Loire. Geologists tell us that, in days gone by, the district was torn by volcanic eruptions, and the traces of the lava are still to be found. This gives to the place a wild and somewhat terrible grandeur. Elevated peaks bristle over a black and yawning gorge, which, branching off into deep and mysterious recesses, forms the upper basin of the principal valley, in which two mountain rills, the Dor and the Dogue, unite, and give their joint names to a noble river. The rocks, lifting their craggy peaks on high, the fissures in those rocks, the unknown depths which they disclose, the giant trees, the roar of the falling waters, all combined, present a picture of remarkable interest, such an one as Salvator Rosa would have loved to paint. It is a singularly suggestive spot to the imaginative temperament. We people the towering rocks and beautiful green valleys with creatures of our own fancy, weave out a story for each